



GTK'S EU-PROJECTS – SUMMARY AND PRACTICAL LESSONS

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CONTENTS

- FP7, Horizon 2020 (H2020) & Horizon Europe (HE) portfolio in minerals sector
 - *Main projects and some new HE proposals*
 - *EGT-TWINN shortly*
- GTK's cooperation network - examples
- Summary of the MIREU H2020 project – Lessons learnt
- Summary of the NEXT H2020 project – Lessons learnt

GTK's FP7, H2020 & HE project portfolio in minerals sector since 2009

ProMine (17,2 Meur)

Minerals4EU (2,7 Meur)

EURARE (13,8 Meur)

BioMOre (8,6 Meur)

FAME (7,5 Meur)

SMARTGROUND (2,5 Meur)

MSP-REFRAM (1,5 Meur)

MICA (2 Meur)

SCREEN (3 Meur)

GeoERA (max 10 Meur)

ORAMA (1,7 Meur)

MIREU (3 Meur)

MINLAND (1,5 Meur)

NEXT (6,9 Meur)

ENeRAG (1,0 Meur)

EIS (7,5 Meur)

Nano-particle products from new mineral resources in Europe

Minerals Intelligence Network for Europe

Development of a sustainable exploitation scheme for Europe's Rare Earth ore deposits

New Mining Concept for Extracting Metals from Deep Ore Deposits using Biotechnology

Flexible and Mobile Economic Processing Technologies

Smart data collection and integration platform to enhance availability and accessibility of data and information of data and information in the EU territory on secondary raw materials

Multi-Stakeholder Platform for a secure supply of refractory metals in Europe

Mineral Intelligence Capacity Analysis

Solution for Critical Raw Materials – a European Expert Network

Establishing the European Geological Surveys Research Area to deliver a Geological Service for Europe

Optimising quality of information in RAW Materials data collection across Europe

Mining and Metallurgy Regions of EU

Mineral Resources in Sustainable Land-Use Planning

New Exploration Technologies

Excellency Network Building for Comprehensive Research and Assessment of Geofluids

Exploration Information System

- 16 projects, 13 years, 81 M€ from EU
- GT': 8 M€ from EU
 - ProMine, NEXT, EURARE & EIS: 61%



TWINNING

European Union Raw Materials Initiative was established in 2008.



ProMine - Nano-particle products from new mineral resources in Europe (FP7)

AgriAs - Evaluation and management of Arsenic contamination in agricultural soil and water (WaterJPI)

EIS – Exploration information System (HE)

FAME - Flexible and Mobile Economic Processing Technologies (H2020)

NEXT – New Exploration technologies (H2020)

2010 → 2011 → 2012 → 2013 → 2014 → 2015 → 2016 → 2017 → 2018 → 2019 → 2020 → 2021 → 2022 → 2023

FP7

Horizon 2020

Horizon Europe

Minerals4EU - Minerals Intelligence Network for Europe (FP7)

MIREU - Mining and Metallurgy Regions of EU (H2020)

EURARE - Development of a sustainable exploitation scheme for Europe's Rare Earth ore deposits (FP7)

BioMOre - New Mining Concept for Extracting Metals from Deep Ore Deposits using Biotechnology (H2020)

MinExTarget - Enhanced Use of Heavy Mineral Chemistry in Exploration Targeting (EIT RawMatter)

In 2022 GTK has ~14 EIT RM projects

ORAMA - Optimising quality of information in RAW MATERIALS data collection across Europe (H2020)

ENeRAG - Excellency Network Building for Comprehensive Research and Assessment of Geofluids (H2020)

HORIZON EUROPE NEW PROPOSALS UNDER EVALUATION

EGT-TWINN - ENHANCING RESEARCH CAPACITY AT THE GEOLOGICAL SURVEY OF ESTONIA TO ACCELERATE THE COUNTRY'S TRANSITION TO GREEN ENERGY

MULTI-MINER - MULTI-SOURCE AND MULTI-SCALE EARTH OBSERVATION AND NOVEL MACHINE LEARNING METHODS FOR MINERAL EXPLORATION AND MINE SITE MONITORING

2022



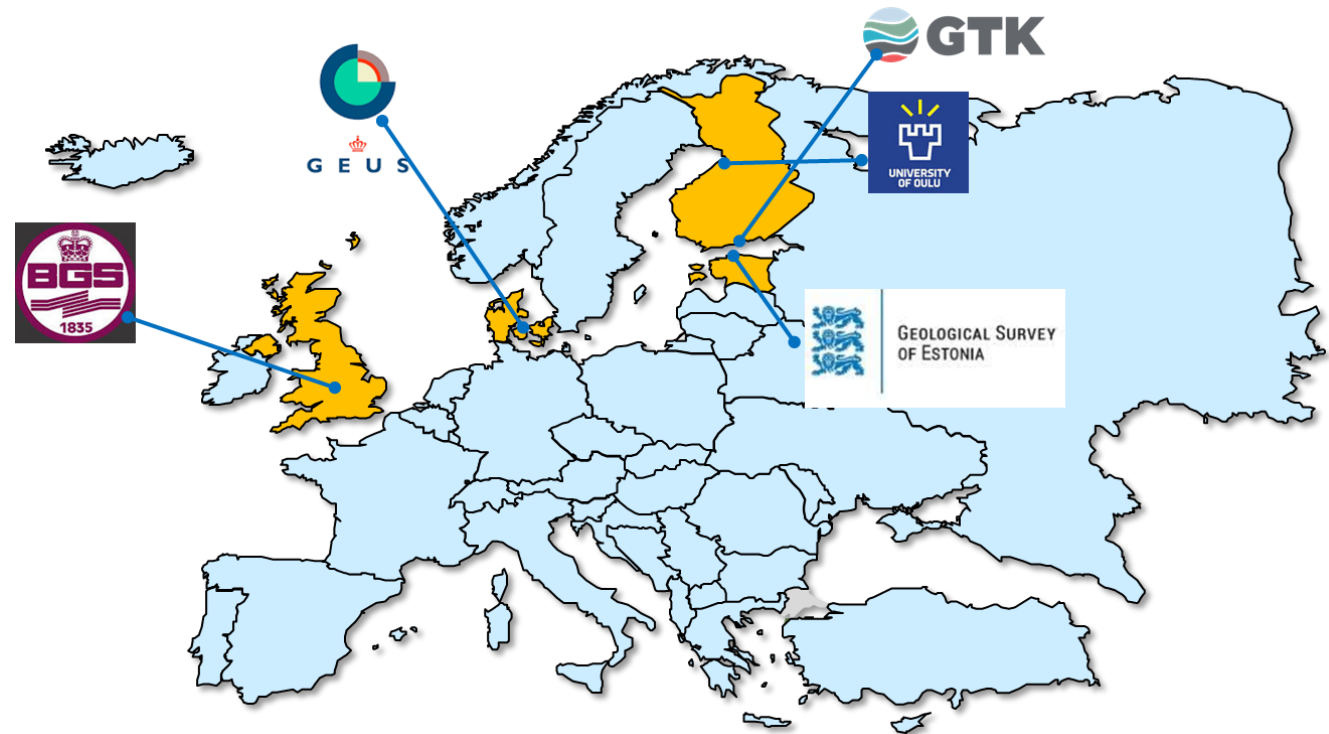
DI MINCHAIN - DIGITAL INNOVATION THROUGHOUT THE EUROPEAN MINERAL VALUE CHAIN: BUILDING A SUSTAINABLE FUTURE

I-SAVE - INTEGRATED STRATEGIES AND INNOVATIVE TOOLS TO MANAGE GROUNDWATER CONTAMINATION STRESSORS UNDER GLOBAL AND CLIMATE CHANGE

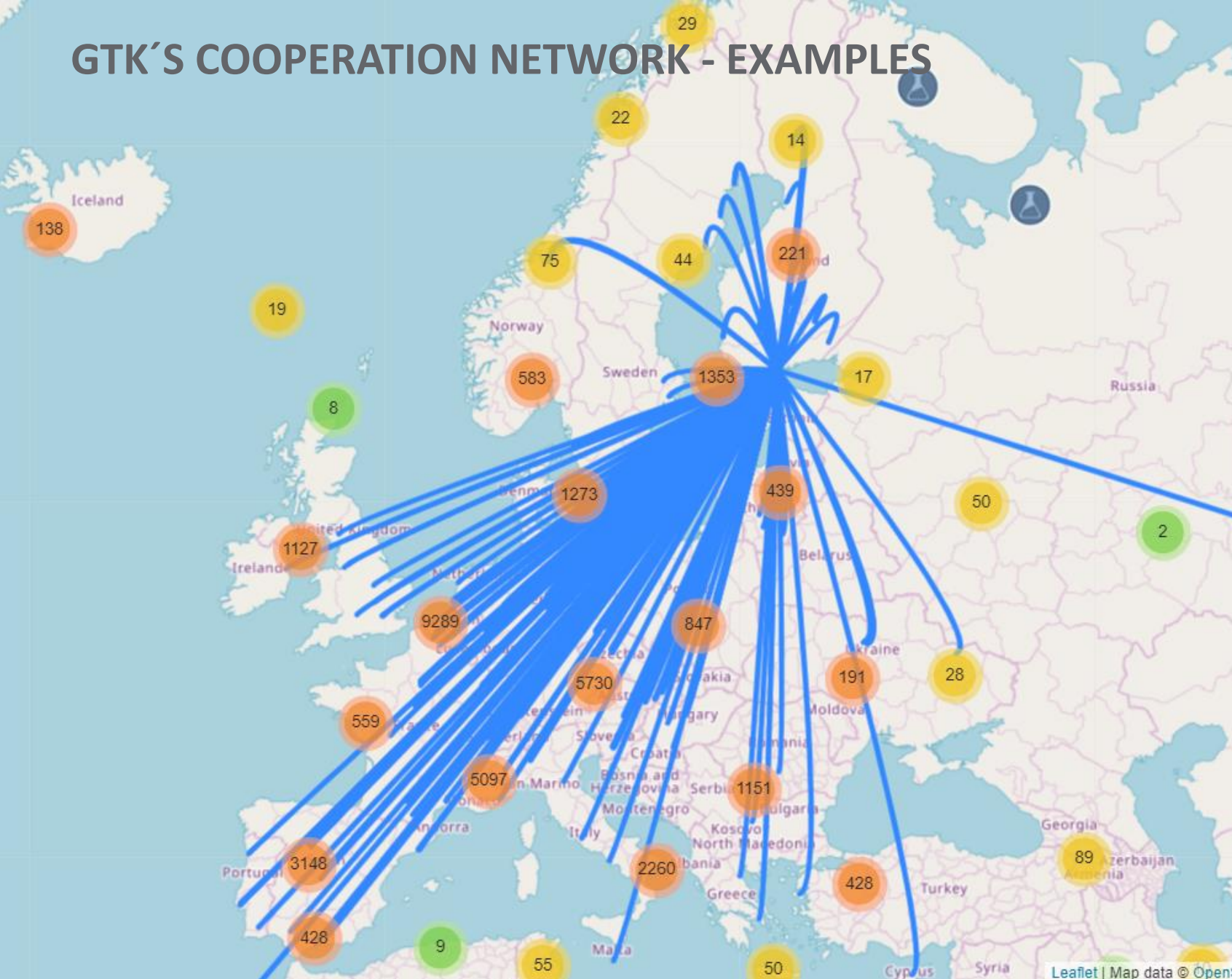
EGT-TWINN - ENHANCING RESEARCH CAPACITY AT THE GEOLOGICAL SURVEY OF ESTONIA TO ACCELERATE THE COUNTRY'S TRANSITION TO GREEN ENERGY

- Twinning project proposal submitted January 2022
- The main objective of the project is to strengthen the research and scientific excellence capacity of EGT via state-of-the-art geological knowledge exchange in the fields of:
 - geological, geochemical and geophysical surveying techniques
 - 3D geological modelling
 - digital capture, management and dissemination of geological data
 - critical raw materials exploration
 - geothermal energy prospectivity
 - Social License to Explore & Social License to Operate
 - Project management

EESTI GEOLOOGIATEENISTUS	EGT	EE	516 750 €
GEOLOGIAN TUTKIMUSKESKUS	GTK	FI	306 638 €
UNITED KINGDOM RESEARCH AND INNOVATION/BGS	UKRI	UK	297 693 €
GEOLOGICAL SURVEY OF DENMARK AND GREENLAND	GEUS	DE	292 955 €
UNIVERSITY OF OULU/OULU MINING SCHOOL	UOULU	FI	85 830 €



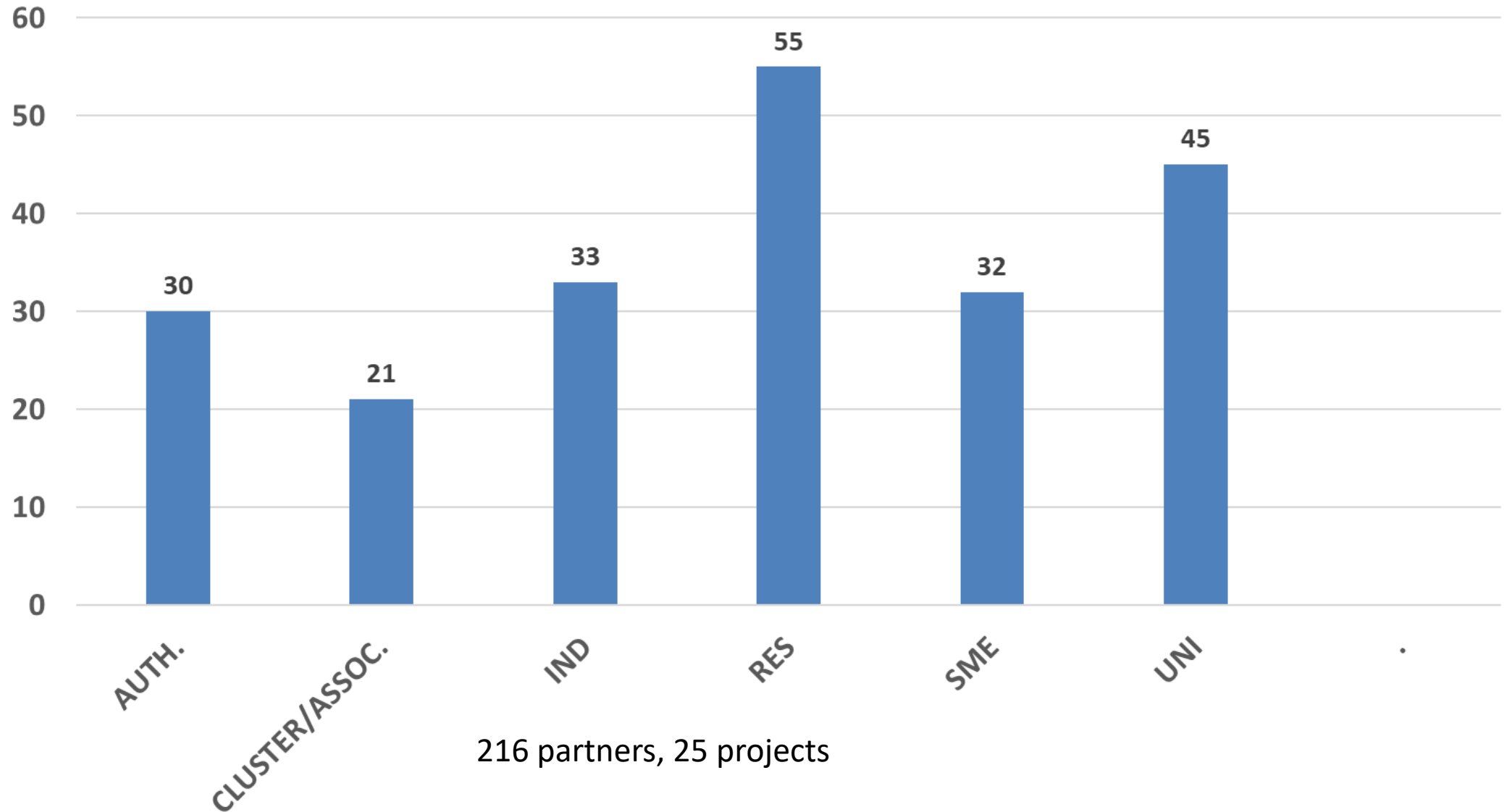
GTK'S COOPERATION NETWORK - EXAMPLES



- Collaboration network of seventeen H2020 projects of GTK
- Collaboration Network shows where organisations are located and who they collaborate with in the context of Horizon 2020 & Horizon Europe research and innovation projects.
- Based on project information as published on the EU Open Data Portal:
<https://cordis.europa.eu/datalab/datalab.php>

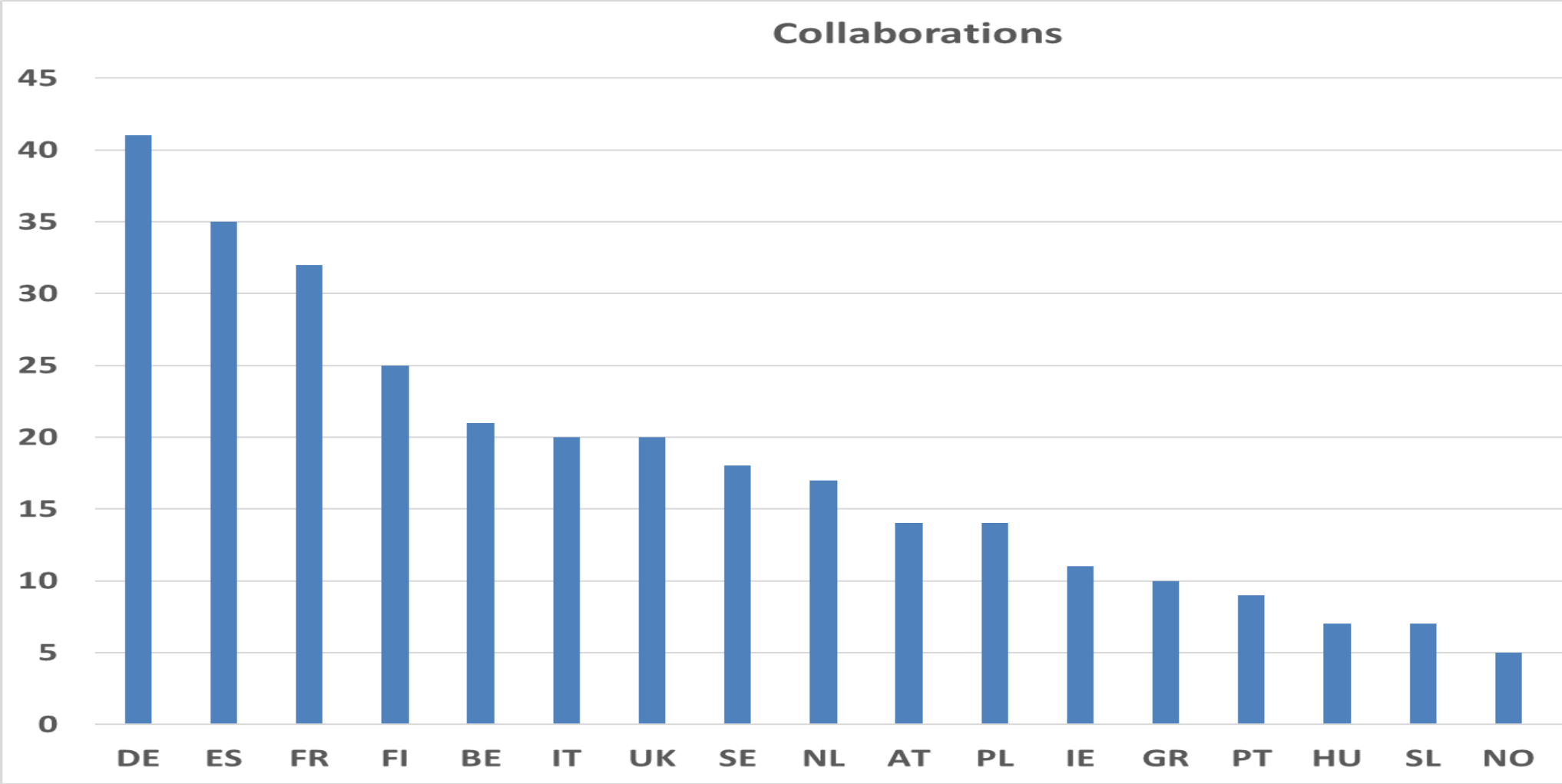
Count of Collaborative organisation legal name

Count of Collaborative organisation legal name by Organisation

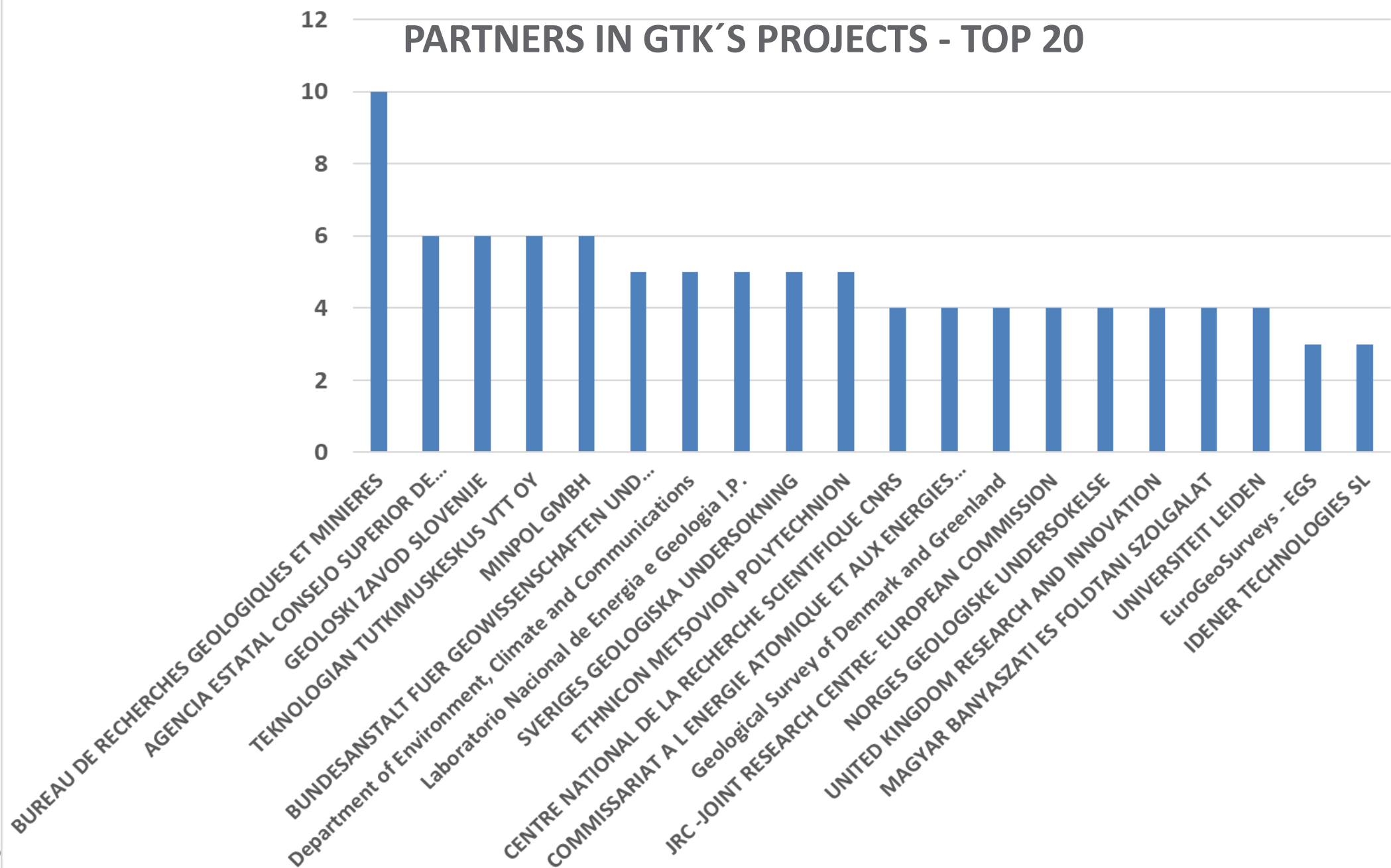


Organisation ▼

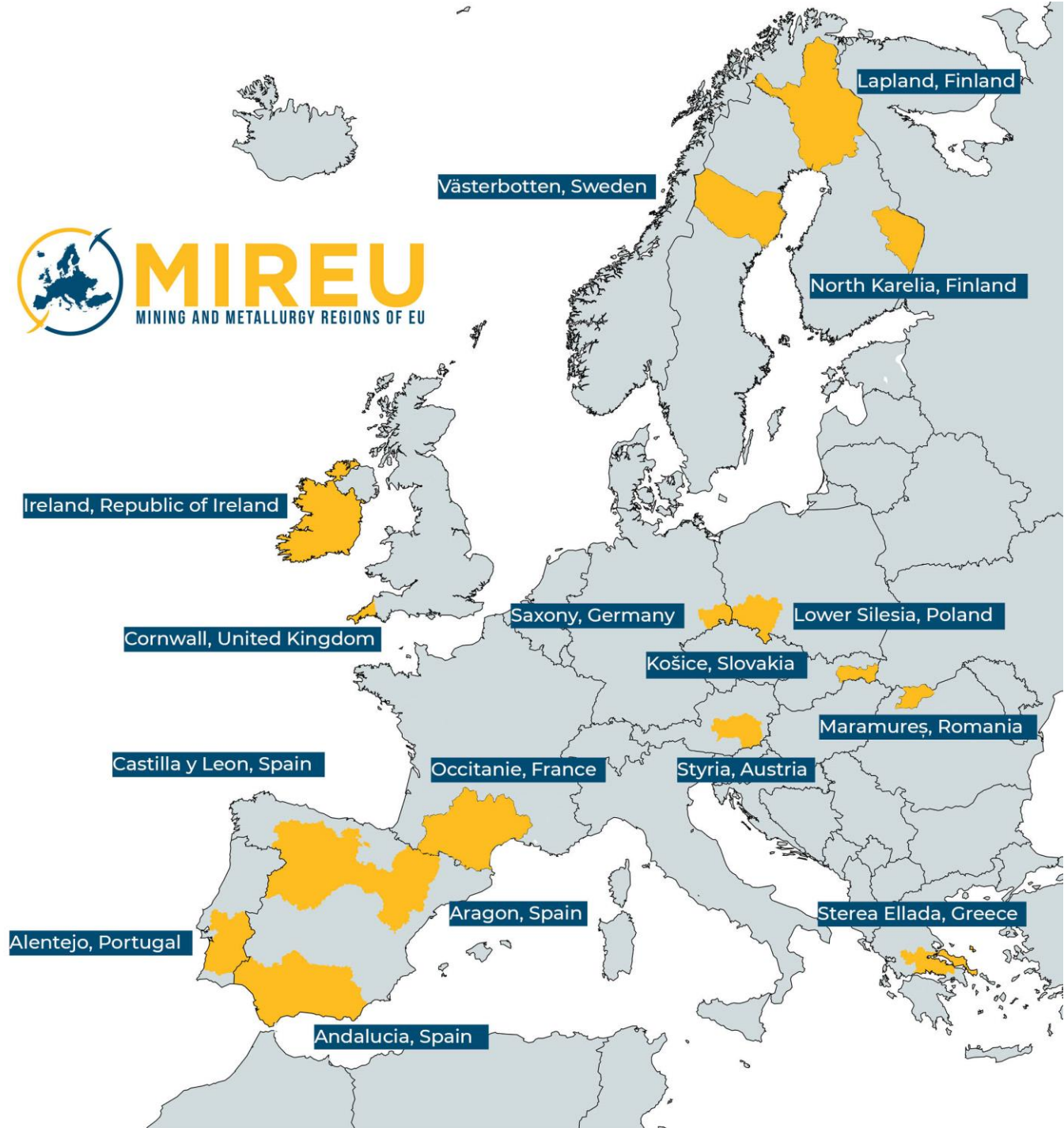
GTK COLLABORATION WITH PARTNERS FROM DIFFERENT COUNTRIES



PARTNERS IN GTK'S PROJECTS - TOP 20



The **main objective** of the MIREU was to identify ways to ensure the sustained and sustainable supply of mineral raw materials to the EU and **to promote investment, innovation and growth in the sector, as well as the regional cooperation.**



WHY REGIONS?

- The regions are the key actors enabling extractive industry through value chain policies, land use planning, regional development plans etc.
 - They also know best their playground (communities, value chains, research...)
- The mining & metallurgical regions often recognize the extractive industries as important to their development
 - But facing also the downsides of the sector (socio-economics, environment...)
- Europe has mining and metallurgy regions, but real cooperation between them has been largely lacking
 - Learning from others, avoiding bad practices
- Is the voice of M&M regions heard in Brussels?
 - Networking increases the ability to affect the EU policy-making



Focus areas of MIREU

Determining the framework conditions that are either conducive or hampering mining and metallurgical development in Europe

- regulatory and policy conditions, public perception and social acceptance, investment conditions

Enhance the cooperation between different mining & metallurgy operations and their hosting regions

- synergies between regional development programs and strategies

Establishing operational synergies between R&I investments (public and private) and the ESIF funds

- exploitation of R&I results in the regions by joint measures

Develop EU level Social License to Operate (SLO) Guidelines and an accompanying Toolkit that will raise the social awareness of mining and metallurgy at the national, regional and local levels





MIREU
MINING AND METALLURGY REGIONS OF EU



CoMMER
Council of Mining & Metallurgy European Regions

To guarantee the continuation of the MIREU network, a **Council of Mining and Metallurgy Regions of Europe (CoMMER)** was established.

This permanent regional network and raw materials-focused working group welcomes also new regions to join.

www.mireu.eu



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 776811 | **Topic: H2020-SC5-2017**

Challenges & lessons

- Mining and metallurgy are not equally important in different regional economies
- Only a few regions in the EU27 define themselves in a socio-economic and strategic way as a mining region
- The small share of mining in most regions, measured in terms of gross national product, makes its importance appear to be of secondary importance compared to the downstream industry. The raw material strategies drawn up by quite a few regions are not given enough consideration in the most important eco-settings (S3).
 - Lack of raw material awareness at governmental level
 - Different level of political support
- Metallurgy as key enabler in Circular Economy is greatly underestimated and can stimulate a Region to become a network partner.



MIREU SLO Toolbox

Key results

- 5 relationship building Activities
- 15 tools
 - Regional approaches
 - Stakeholder dialogues
 - SLO video
 - SLO card game
 - SLO indicators
- Several consultations – ISP, WP4, Cornwall & Spain
- *SLO Good Practices and Recent Disputes: Illustrative Examples Across Europe (47 cases)*
- Benchmarking report

<https://mireu.eu/slo>

SLO Toolbox for Europe

SLO TOOLBOX				
RELATIONSHIP-BUILDING ACTIVITIES	TOOLS	TOOLS FOR AUTHORITIES	TOOLS FOR COMMUNITIES	TOOLS FOR COMPANIES
Activity 1 Familiarise	Tool 1.1: PEST Analysis Template			Tool 1.1
	Tool 1.2: Regional Approaches			Tool 1.2
	Tool 1.3: Stakeholder Mapping and Stakeholder Frames	Tool 1.3		Tool 1.3
Activity 2 Introduce	Tool 2.1: Checklist for First Meetings Between Community-Company		Tool 2.1	Tool 2.1
	Tool 2.2: Checklist for First Meetings Between Community-Government	Tool 2.2	Tool 2.2	
	Tool 2.3: SLO Video	Tool 2.3	Tool 2.3	Tool 2.3
Activity 3 Reach out	Tool 3.1: Community-Company Vision Statement		Tool 3.1	Tool 3.1
	Tool 3.2: SLO Card Game	Tool 3.2	Tool 3.2	Tool 3.2
	Tool 3.3: Financial Mechanisms to Encourage SLO	Tool 3.3		
Activity 4 Establish	Tool 4.1: Community Engagement Plan		Tool 4.1	Tool 4.1
	Tool 4.2: SWOT analyses – template and examples	Tool 4.2		Tool 4.2
	Tool 4.3: Grievance Mechanism	Tool 4.3	Tool 4.3	Tool 4.3
	Tool 4.4: SLO Indicators	Tool 4.4	Tool 4.4	Tool 4.4
Activity 5 Strengthen	Tool 5.1: Community-Company Environmental Monitoring Plan		Tool 5.1	Tool 5.1
	Tool 5.2: Community Agreements	Tool 5.2	Tool 5.2	Tool 5.2

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Geoscience for a sustainable Earth

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Classroom &
Facilities



REGION
VÄSTERBOTTEN



European Regions
Research and Innovation Network



REGIONAL COUNCIL
OF LAPLAND



Junta de
Castilla y León

Consejería de Economía y Hacienda
Dirección General de Energía y Minas



NEXT – New Exploration Technologies

H2020 research project on the development of novel technologies for ore exploration



NEXT key figures

- ✓ Call: H2020-SC5-13c-2016-2017
- New solutions for sustainable production of raw materials
- ✓ Duration: 01.05.2018 – 30.09.2021
- ✓ Total budget: 6.9 Mio. €
- ✓ Coordinator: Geological Survey of Finland
- ✓ Consortium: 16 partners from 6 EU countries



<https://new-exploration.tech/>

Scientific coordinator; Vesa Nykänen, vesa.nykanen@gtk.fi

Project manager: Juha Kaija, juha.kaija@gtk.fi

The main objective of NEXT was to develop innovative and sensitive exploration concepts and technologies, and to investigate and promote their acceptance by the society.



Technology related

New and more sensitive exploration technologies and solutions



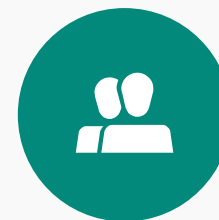
Economy related

Exploration at lowest possible costs and identification of new exploration targets



Environment related

Reduction of the exploration footprint



Society related

Improving awareness and trust of society to a sustainable raw materials exploration



Policy related

Recommendations to feed the Raw Materials Strategic Implementation Plan

NEXT – New Exploration Technologies



H2020 research project on the development of novel technologies for ore exploration



This project is funded by the European Union

 info@new-gen.eu

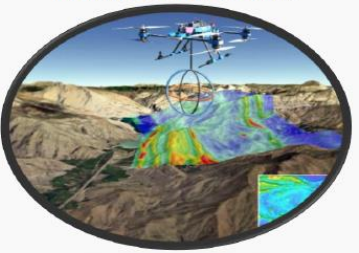
May 19th, 2020

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New exploration technologies



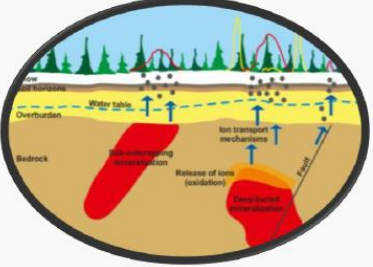
Task 3.1 EM for Drones



Task 3.2 Vector magnetic field



Task 3.3 Multi-source surface geochemistry



Task 3.2 Satellite Imagery Downloader

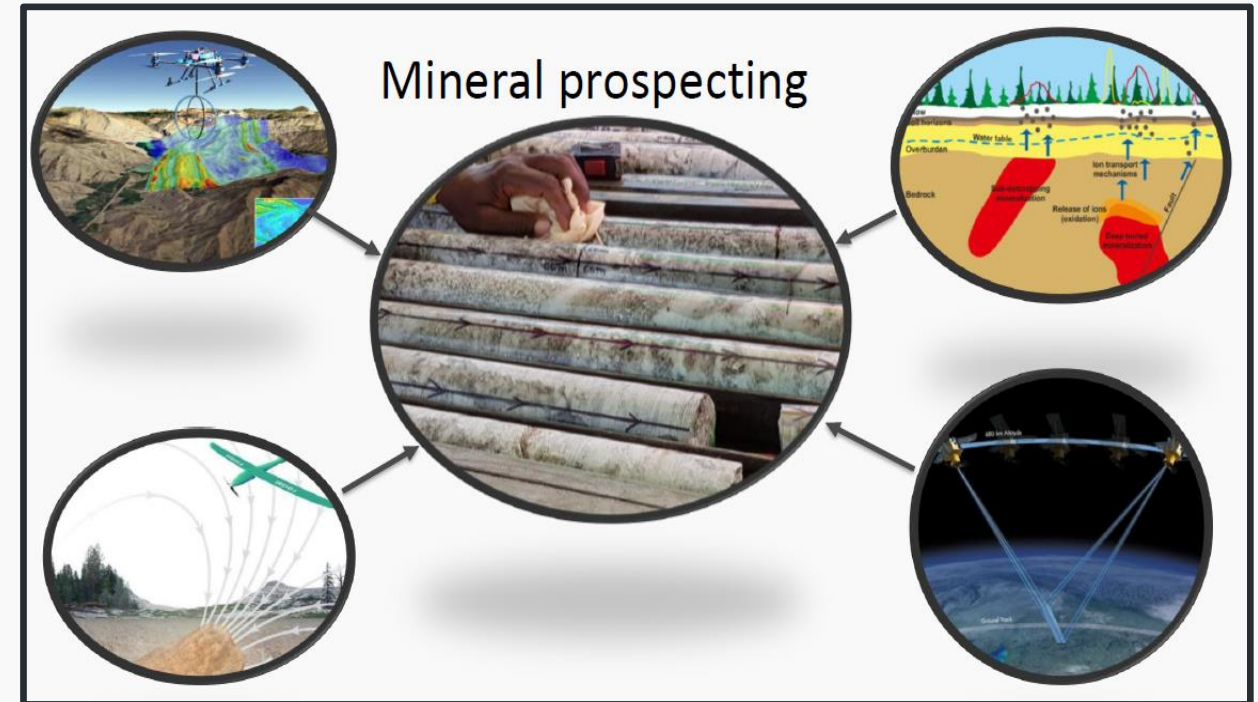


YARA

This project is funded by the European Union

November 12, 2020

3



NEXT is about the mineral exploration targeting in guiding exploration geologists to specific locations for bedrock drilling, avoiding the need for the conventional use of heavy-machinery assisted sampling. Also, possibly, socially more acceptable.



New exploration technologies – EM survey system business potential

- Mineral exploration (subsurface and deep deposits)
- Detecting water leaks from tailings, dams, landfill areas
- Detecting underground cables and wires
- Peat thickness measurements
- Detecting underground UXO's
- More sensors in one platform

Novel electromagnetic (EM) survey system on UAV for mineral exploration was acknowledged by the **European Commission's Innovation Radar**. Market Creation Potential of the innovation: *Addresses needs of existing markets. Radai, Loop & Line, GTK.*



Radai's team prepares for launch of its pioneering drone



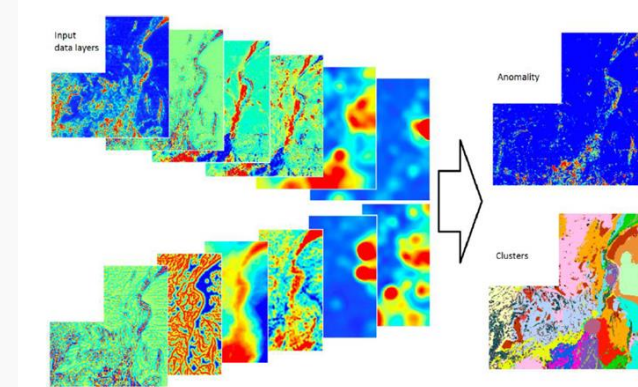
Data fusion



Tasks:

- Spectral, multiscale, multi-sensor exploration data integration
- Upgrading existing and new geophysical data
- Field spectroscopic techniques
- Data mining/spatial data analysis
- Effect on mineral resource estimates

Example of data integration: multiple input data layers from geophysics and geochemistry are combined to produce maps showing either the level of anomaly of each pixel or the areas with similar properties.



- **SOM Toolbox for Esri ArcGIS.** The new version has been published and is available for free download with the source code under GitHub: <https://github.com/Beak-Consultants-GmbH/ArcGISSOM>
- **GisSOM** has been used for analysing geoscientific data from the Rajapalot test site. GisSOM is publicly available for download on GitHub: <https://github.com/gtkfi/gissom>

Social License to Explore (SLE)



New Exploration Technologies for a More Efficient, Economic and Environmentally Friendly Ore Exploration

- A **Social License to Explore** refers to local acceptance of mineral exploration. An SLE is especially important in the green fields, i.e., areas where mineral exploration companies are newcomers and often the first representatives of the industry.
- There is very little evidence-based knowledge about the SLE, for example the factors that shape local attitudes, the importance of early interaction, the nature of impacts and the role of technology. It has not been prioritized in research, nor by industry, as the social impacts of exploration are considered less intrusive than those of mining.
- To gain an SLE, the important issues are (1) early communication and interaction with the local community; (2) to know the local context is a precondition for the SLE; (3) national legislation sets the frame for the SLE. SLE is also influenced by people's attitudes towards mining.



Thank you for your attention!

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- H2020 New Exploration Technologies - NEXT:
<http://www.new-exploration.tech/>
- H2020 Mining and Metallurgy Regions of EU - MIREU:
<https://mireu.eu/>

